

RAPID FIBER PREFORM PROCESSING

The National Composite Center

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JTEG

Composite Manufacturing and Repair

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National Composite Center



“... promote the innovative development and application of composites and composite technologies in a united effort with industry, academia and government.”

History of NCC

- Established 1996 as private, tax exempt company
- Focused on **AFFORDABLE** composite processing for **PREPRODUCTION DEVELOPMENT** and **LIMITED PRODUCTION** operations
- **World-class facilities and expertise** in Directed Fiber Preforming, VARTM, and Precision Filament Winding
- **Unique group of experts** in aerospace, automotive, commercial and infrastructure composite materials and applications

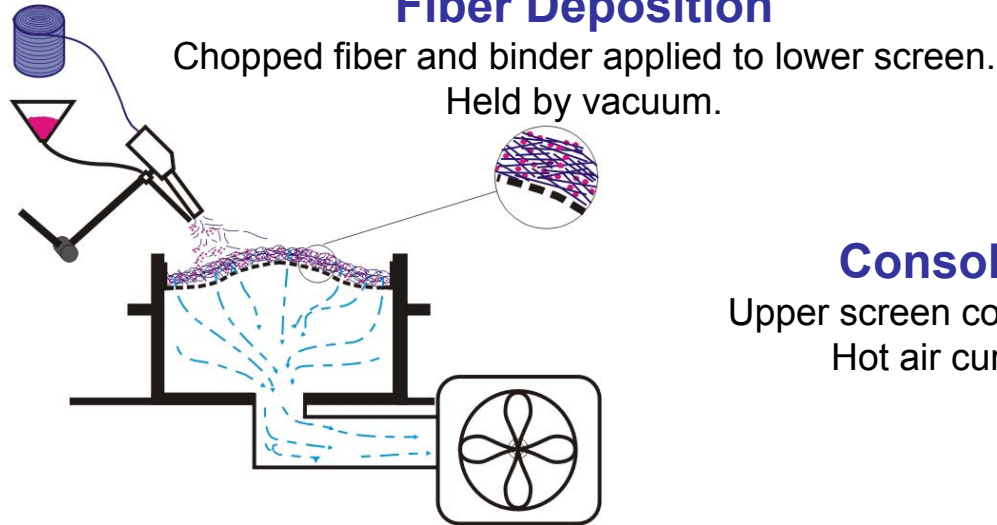


National Composite Center Facilities

- 200,000 sq.ft.
 - 100,000 sq.ft. prototype development / manufacturing
 - 60,000 sq.ft lab / shop
 - 40,000 sq.ft office / training

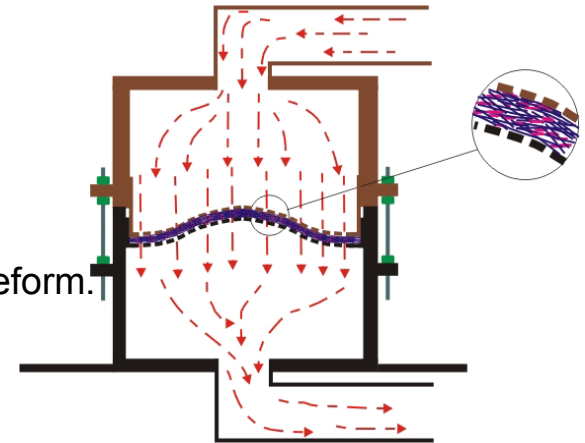
Programmable Powdered Preform Process (P4)

Fiber Deposition



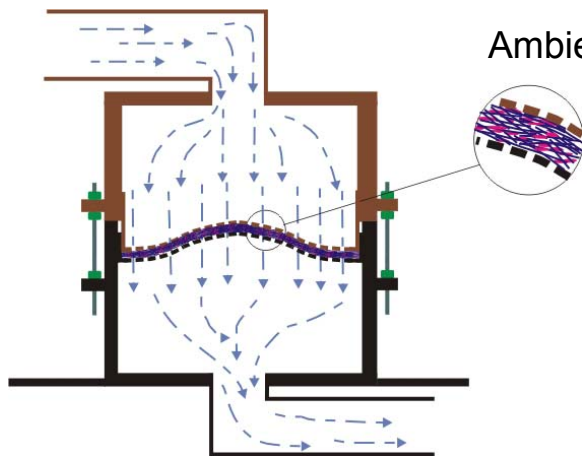
Consolidation

Upper screen compacts preform.
Hot air cures binder.



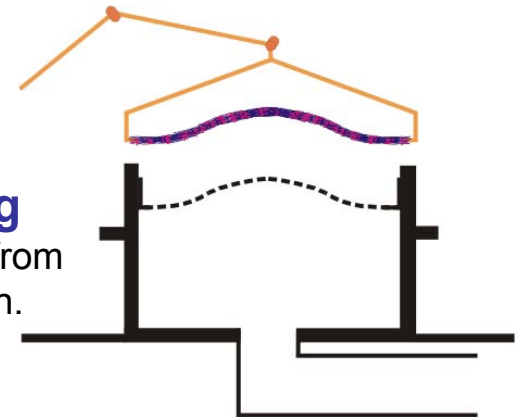
Cooling

Ambient air cools preform.



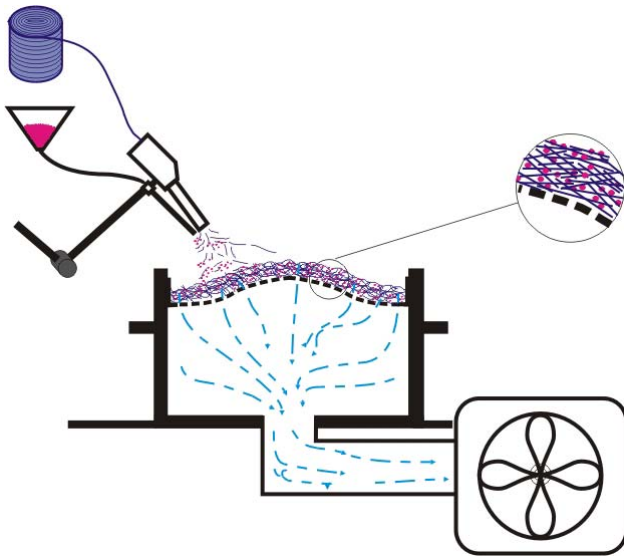
De - Molding

Preform removed from
the lower screen.



Preform must be subsequently infused by RTM, VARTM, or RFI

Lower Cost Preforms for Lower Cost Molding Processes

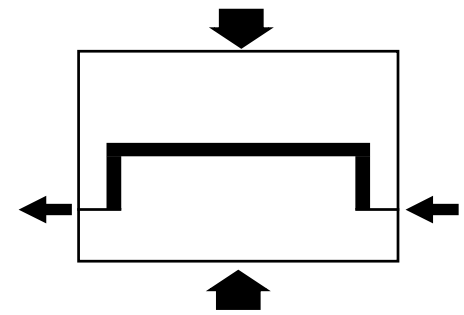


Apply lower cost preform technology from industrial sector to defense systems

Structural Reaction Injection Molding (**SRIM**)

Resin Transfer Molding (**RTM**)

Vacuum Assisted RTM (**VARTM**)



Affordable Aerospace Components

- Conceived by Air Force to apply low cost industrial process (P4) to aerospace (P4A)
- Phase I and II completed (CY 1997 to 2002)
 - Equipment and material development
- Phase III completed (CY 2002 to 2003)
 - Process development and data generation
- Phase IV started (FY03, CY 2003 - 04)
 - Process maturation and application development

Demonstration Articles Completed

YC-15 Tailcone
80% Cost
Savings



F/A-18 Access Cover
46% Cost Savings



C-17 COSP
40% Cost Savings



C-17 Pylon Stub Fairing
40% Cost Savings



Rapid Fiber Preform Process

Applicable to Low Volume

- The Rapid Fiber Preform process has demonstrated cost effectiveness.
- Secondary structures.
- VARTM infusion processing.
- Between 10 and 15 parts/year.
- Payback in 24 to 36 months.